

In re Patent Application of:

MEARS

Serial No. **not yet assigned**

Filed: **herewith**

Attorney Docket: **62601_CON2**

IN THE CLAIMS:

Please cancel Claims 1 to 71.

Please add new Claims 72 to 97.

72. (new) A semiconductor device comprising:
a superlattice comprising a plurality of stacked
groups of layers;

each group of layers of said superlattice comprising
four stacked base semiconductor monolayers defining a base
semiconductor portion and an energy band-modifying layer
thereon;

said energy-band modifying layer comprising at least
one non-semiconductor monolayer constrained within a crystal
lattice of adjacent base semiconductor portions.

73. (new) A semiconductor device according to Claim
72 wherein said superlattice has a common energy band
structure therein.

74. (new) A semiconductor device according to Claim
72 wherein said superlattice has a higher charge carrier
mobility in at least one direction than would otherwise be
present.

75. (new) A semiconductor device according to Claim
74 wherein the higher charge carrier mobility results from a

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lower conductivity effective mass for the charge carriers in the parallel direction than would otherwise be present.

76. (new) A semiconductor device according to Claim 75 wherein the lower conductivity effective mass is less than two-thirds the conductivity effective mass that would otherwise occur.

77. (new) A semiconductor device according to Claim 74 the charge carriers having the higher mobility comprise at least one of electrons and holes.

78. (new) A semiconductor device according to Claim 72 wherein each base semiconductor portion comprises silicon.

79. (new) A semiconductor device according to Claim 72 wherein each energy band-modifying layer comprises oxygen.

80. (new) A semiconductor device according to Claim 72 wherein each energy band-modifying layer is a single monolayer thick.

81. (new) A semiconductor device according to Claim 72 wherein said superlattice further comprises a base semiconductor cap layer on an uppermost group of layers.

82. (new) A semiconductor device according to Claim 72 wherein each non-semiconductor monolayer is thermally stable through deposition of a next layer.

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83. (new) A semiconductor device according to Claim 72 wherein each base semiconductor portion comprises a base semiconductor selected from the group consisting of Group IV semiconductors, Group III-V semiconductors, and Group II-VI semiconductors.

84. (new) A semiconductor device according to Claim 72 wherein each energy band-modifying layer comprises a non-semiconductor selected from the group consisting of oxygen, nitrogen, fluorine, and carbon-oxygen.

85. (new) A semiconductor device according to Claim 72 further comprising a substrate adjacent said superlattice.

86. (new) A semiconductor device according to Claim 72 wherein said superlattice further comprises at least one type of conductivity dopant therein.

87. (new) A semiconductor device according to Claim 72 wherein said superlattice defines a channel of a transistor.

88. (new) A semiconductor device comprising:
a superlattice comprising a plurality of stacked groups of layers;

each group of layers of said superlattice comprising four stacked base silicon monolayers defining a base silicon portion and an energy band-modifying layer thereon;

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said energy-band modifying layer comprising at least one oxygen monolayer constrained within a crystal lattice of adjacent base semiconductor portions.

89. (new) A semiconductor device according to Claim 88 wherein said superlattice has a common energy band structure therein.

90. (new) A semiconductor device according to Claim 88 wherein said superlattice has a higher charge carrier mobility in at least one direction than would otherwise be present.

91. (new) A semiconductor device according to Claim 90 wherein the higher charge carrier mobility results from a lower conductivity effective mass for the charge carriers in the parallel direction than would otherwise be present.

92. (new) A semiconductor device according to Claim 90 the charge carriers having the higher mobility comprise at least one of electrons and holes.

93. (new) A semiconductor device according to Claim 88 wherein wherein each at least one energy band-modifying oxygen monolayer is a single oxygen monolayer thick.

94. (new) A semiconductor device according to Claim 88 wherein said superlattice further comprises a base semiconductor cap layer on an uppermost group of layers.

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95. (new) A semiconductor device according to Claim 88 further comprising a substrate adjacent said superlattice.

96. (new) A semiconductor device according to Claim 88 wherein said superlattice further comprises at least one type of conductivity dopant therein.

97. (new) A semiconductor device according to Claim 88 wherein said superlattice defines a channel of a transistor.